

NETHERLANDS
: EAST-INDIAN :
SAN-FRANCISCO-
COMMITTEE.

DEPARTMENT OF AGRICULTURE
INDUSTRY & COMMERCE

:: :: No. XXXIII :: ::

Oils and Oil-Containing Seeds.



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1914

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Oils and Oil-Containing Seeds.

The population of Netherlands East India lives on Agriculture. This will appear from the appended statement giving a review of the value, in units of one thousand guilders, of the exports of oil seeds, oils and fats during the period of 1908 to 1912, showing that the products manufactured from indigenous oil seeds, viz: the oil and the oil cakes, do not amount to more than about two per cent of the total. And even this small surplus available for export does not really exist, since there is a still larger import of oils and cakes. Notwithstanding the abundance of crude material, which during the years 1908 to 1911 allowed to export for an average of $43\frac{3}{4}$ million guilders, the colony itself does not work up a quantity sufficient to cover its own requirements.

The figures point to the fact that the cultivation of oil bearing plants is of great importance, and what renders them particularly important from an economical point of view is that they are produced not by European owned plantations, but to a large extent by the natives. The millions which are paid for the oil seeds flow for the greater part to out of way places. Numerous islands of this Archipelago would be in distress without the production of these oil-containing seeds. Naturally this circumstance also has its drawback. In consequence of the fact that the oil seeds are cultivated by the natives, the quality very often is not as superior as it could be. One cannot expect an eastern population living in material things from one day to the next, to take measures so as to obtain a better product or even to keep it to the proper mark. On the contrary: their ingeniousness is inexhaustible in finding means to make money out of their products as quickly as possible, and to spend no more trouble to the preparation as is absolutely necessary to make the goods just saleable. The raw material for the oil mills is always in demand, even when the quality is bad, and as competition amongst purchasers in Netherlands East India is exceedingly keen, buyers are always easily to be found. It is simply

hopeless to expect the exporters to combine and co-operate so as to obtain a superior quality.

The history of the rise of the trade in oil-containing seeds is the history of the coconut, which has the lion share of the export, and which supplies most of the oil for domestic purposes, the oil which is superior and therefore preferred to all other oils for human consumption. Coconut oil is used by the natives for all purposes for which a fat oil can possibly be used, until recently on a large scale also for burning purposes. As a lamp oil however it has practically been supplanted by the cheaper kerosene. Since this supplanting process was a very rapid one, it goes without saying that employment had to be found for enormous quantities of coconuts. This fact explains why the export of copra expanded so enormously from the moment it appeared that the dried flesh of the coconut was willingly absorbed by the market. The export of it from the Netherlands East Indies started about 1870. In the official reports of 1872, the first mention was made of the export of dried coconuts from Sumatra to Penang. It is however wrong to suppose that the drying of coconuts is a modern invention, as the name „copra” was already known in the 18th century in British India for a commercial product consisting of the dried flesh of the coconuts.

In Netherlands East India the actual foundation for the new industry was in 1872 laid by a German firm in North Celebes, who then made an experimental shipment to Europe. This shipment however never reached its destination, as the ship foundered. In 1874-75 the experiment was repeated and opened a new era in the development of trade and shipping in these colonies. Ten years later, Java followed the example given by Celebes; also in Java the preparation of copra expanded in a few years, notwithstanding the local price only amounted to fl. 5.— per picul. It is unnecessary to say here that the increasing value which taken on an average at present is about three times as high as it used to be in the beginning, has caused an enormous extension of the planted area. The population was familiar with this cultivation, which does not lay a claim too heavy to its fancy for working, and taking into consider-

ation that the cultivation has so far remained unattacked by serious diseases, it is no wonder that a continual increase of the production may be noticed everywhere. The export figures of the last few years speak for themselves. Plantations are still being extended. Entire districts in Java as well as in the possessions beyond Java, have been turned into vast coconut groves. Some fairly large-sized islands have been planted up with coconut palms from the beach to the summits of the hills. Where the country is thickly populated, as is the case in Central Java, the spacious compounds are planted up with coconuts, so that one may think the houses were situated in an endless coconut garden.

It is only lately that European money has claimed a share in this cultivation, and in consequence thereof, the fact remains that at present nearly all coconut plantations are the property of the native population. Government encouraged the cultivation directly by supplying the seeds, and indirectly by removing obstacles which were in the way of a proper development.

Opinions differ as regards the original native country of the coconut palm. Some state that the palm originates from tropical America. But it must be said that if the coconut palm is not an indigenous plant of East Asia, it has obtained citizenship in Netherlands East India so well that it is now found in nearly every island of the Archipelago. Wild coconut palms are not found in these regions. It has been said that wild trees have been found, but this has never been sufficiently proved. It is even very improbable that the palm without the aid of human beings should find a suitable place amongst the existing vegetation. Thanks to the thick peels which prevent seeds from breaking when the ripe fruits fall down from the high tree, it has happened that the fruit was taken away by sea currents, but no individual case is known where coconuts washed ashore by the sea started a new vegetation. In some cases where the propagation seemed to be spontaneous, it was proved later on that human beings had lent their intermediacy.

It is a fact that coconut palms were found on an island created by volcanic actions, which palms although poorly

thriving could be said to be present on bare uninhabited islands. The first impression was that the sea had washed the seeds ashore; later on it appeared that the chief of a neighbouring island had planted the trees there. It is very probable that in this way, the most useful of all palms have been spread from one island to another. Furthermore it is striking that the coconut palm plays no part in the native legends, whereas other palms which are doubtless indigenous, such as for instance the sugar palm, are continually mentioned in legends, and myths.

Coconut palms thrive best on the sea beach within hail of the breakers. However a salty atmosphere is not an absolute condition of life. In Netherlands East India they bear fruit up to an elevation of 3,000 feet above sea level, but in places higher than 1500 feet fruits become scarce. According to the popular believe the tree likes the company of mankind, and will not thrive beyond the reach of the human voice, and for this reason it is always to be planted close to the dwelling houses. The background of this superstition presumably is that although the maintenance required by the tree is not large, attention paid to the plant is well rewarded, and trees planted far from human settlements are naturally more or less neglected. Except for growth and productiveness there is no difference between plants cultivated at various elevations. In higher elevations where the fruit bearing capacity is limited, the tree is not planted for the sake of its fruit, but for the sweet saps of its inflorescences, from which an aromatic brown sugar is obtained, which is sold in Java in considerable quantities, the same as is the case with a similar product obtained from the sugar palm. Also in the lower regions the trees are sometimes tapped, as the opinion prevails that this increases the productiveness.

The botanical varieties are numerous. These are divided into two groups, viz: those growing 15 to 30 feet high, and bearing within four years after being planted, and those which grow higher, and only bear when about seven years old. The first category — these which ripen early — lose their productiveness when 12 to 15 years old, but the others may reach the age

of a century. Those species which have an economical value belong all to the latter group. Attentive observers as the natives are, they distinguish numerous kinds according to the colour of the unripe fruits, the ribs of the leaves, etc., and have separate names for all these various forms, but only a few of these are generally recognised in Java as good and these are consequently planted everywhere by preference. It is not quite clear to what extent differences exist really, but it is a matter of fact that some varieties are preferred for their richness in oil, others for the taste of the juice, etc.

Every part of the tree is useful. The roots have generally a certain reputation as a diureticum. The hard horny wood, although not very durable, is used for native and other cheap buildings. The sweet juice of the inflorescences can be tapped, and as was stated above, used for making sugar. The gigantic leaves are utilised for making baskets and other plait work, intended to be of short duration, whereas brooms are made from the stiff ribs. The undeveloped leaves form a delicious vegetable, but can only be obtained when the coconut palm is for one reason or other to be felled, as naturally the tree dies when deprived thereof. The most useful product are the fruits of course: when very young these are used for medicinal purposes, and the half grown fruits too take a very important part in the native medical science. Their juice is consumed by the natives against bowel complaints and many medicines have to be prepared with coconut water, in order to acquire—according to native belief—a maximum of curing power. The husk is used for the manufacture of coir, but only to meet the local demands of the natives. Superior coir and coconut fibre manufactures have to be imported. The hard shells of the nuts are used as cups, measures, etc. and also as a fuel of great heating power. The fresh fruit is an important condiment and food, which can be consumed in various forms, mostly grated. When kneaded with water this grated flesh produces an emulsion which replaces milk in many native dishes (not drinks). The grating is also the first manipulation when oil is made out of fresh nuts.

If a small quantity is to be dealt with, the grated stuff after

some water having been added, is well kneaded and pressed; large quantities are sometimes trod. The liquid flowing out is collected and heated until the water is evaporated and the pure oil remains. It also happens that the emulsion is simply left alone: a creamy layer will then appear on the surface. By letting the wheyish fluid underneath flow away the balance can be heated and the oil separated. The oil obtained in this way is the best and fetches highest prices. Only ripe fruits are used for this purpose. Fruits which are not quite ripe are treated differently, the grated flesh being allowed to ferment before pressing. The residue of ripe nuts when dealt with on a large scale is also treated once more. This is subjected to a long fermenting process. In this manner oils of different qualities are made from fresh fruits, which qualities have each their own name. Only superior kinds are reserved for human consumption, also by the natives. The residue almost deprived absolutely from its oil contents is not of much use. When obtained from ripe unfermented nuts, it is sometimes used for consumption. Inferior qualities are given to the fowls, and still worse qualities are thrown away or burnt. The albuminous matter, which coagulates when the oil is boiled is consumed as a sweetmeat.

The utensils for this primitive but very efficient method of preparation are no others than a rasp (a small board studded with pins), sometimes a primitive press and open pans for boiling. The preparation of oil is done for own consumption, or by way of profession. This method however is not good enough for an industry on a large scale, since the concentration of a great many nuts in a central factory would be very expensive, furthermore there is no certainty of always obtaining nuts in sufficient quantity.

It goes without saying that a population of about 40,000,000 who only consumes vegetable fats, and by preference, coconut oil, are responsible for an enormous consumption. The balance of the nuts are used for preparing copra. Copra is dried in various ways. Sometimes the owner of coconut trees deals with his own fruit, and in other districts it is more usual that the fresh nuts are sold in the open market to people

who make a speciality of preparing oil or copra. These latter people are found in Java in great numbers. As a rule they are Chinese, sometimes they are natives who work on a small scale, but very seldom Europeans. In Central Java, which is responsible for about half of the Java production, the nuts are brought to the market piled up in manloads, cut into halves, and freed from the husk, a narrow strip excepted, which holds the two parts together and allows two nuts to be tied one to the other. This is done to reduce the weight, and to spare room, whereas it releases the buyer from the trouble and cost of husking the nuts. This is a very practical method, but has also one drawback. The market takes place in the early morning so that the sellers leave their places before sun-rise. The nuts are therefore cut during the preceeding day and this has a bad influence on the quality of the copra, as it is better to dry the copra in the sun immediately after the nut has been opened. It happens that when the nuts are not dried immediately, the copra turns black, and this influences the prices, because as a rule black copra has a tendency to become mouldy. This method might also be of disadvantage to the seller in case he might not be able to sell his nuts during market day at the highest rate, but even if this were the case he would not dream of taking them home again. Furthermore the competition in the market is a practical guarantee for him that he will make his maximum price. Artificial manipulations for squeezing the prices of nuts have not been heard of so far, and the price is merely regulated by the official quotations of copra and oil, the margin for the preparation being very small.

After the nuts have been received by the copra dryer they are, in Central Java, handed over to women, who remove the remaining stripe of the husk and thereafter skillfully take out the flesh from the shell. Cases have been known where one woman alone could peel 900 nuts in ten hours. A small broad blunt knife is used, which is forced between the shell and the flesh. A method which reminds of the shelling of an egg. In order to obtain superior copra the flesh of the fruit must be fresh and hard; only with ripe fruits the flesh is hard.

The flesh is thereupon exposed to the sun on bamboo frames,

at about one and a half feet above the ground. During the drying process, the flesh is daily turned over, and when the weather is favourable the product can be packed and forwarded to the seaports after about five days. When it arrives there it is piled up in the warehouses, and examined by the exporter, who deducts from the purchase price if the copra is not dry. In the seaport the stuff is stored until quite dry and then repacked in new gunny bags before shipment. The method of preparation described above is the most usual in Java, and generally gives good results.

Another method is sometimes adopted in Java, and always in the possessions beyond Java. There the shells are not immediately removed, but only so after the flesh has been slightly dried. In this way the flesh can be far easier separated from the shell; but this method has its drawback, viz. that the drying in the shell takes place more slowly, and the space necessary for preparing copra in this way must be far bigger.

During the rainy season, it also happens in Java that copra is dried artificially. For this purpose bamboo frames are used placed higher from the ground, under which a small fire is lit, avoiding smoke as much as possible by using dry coconuthusks and shells. When skillfully and carefully done, an excellent product can be obtained without a trace of a smoky smell. However artificial drying is an exception in Java. In the rainy season also the majority of the copra is dried in the sun. It happens of course that the drying takes much longer and that the partly dried copra gets wet by rain, but this is not so harmful, if the rains do not fall continuously, and are followed by bright sunny weather. If the worse comes to the worse, the insufficiently dried flesh can always be used by the natives for preparing oil.

The preparation of sun dried copra is also to a large extent adhered to in the islands beyond Java, and in some of them the product is not inferior to that of Java. All the same, the copra not prepared in Java rules a lower market, and this is explained by the fact that outside of Java, the superior and inferior qualities are mixed, in consequence of which the value follows the lowest grade. There is one drying method which considerably

reduces the value of the product, and that is the smoking of the flesh until it is dry. The nuts after having been cut in halves are for that purpose piled up on kilns under which fires are burned, sometimes only during night-time, and sometimes also during the day, so as to support the heat of the sun. As soon as the flesh is dried enough to be easily removed from the shell, this flesh is further separately dried. By adopting this method, the drying is done very quickly, — as a matter of fact, too quickly — as the inside of the copra thereby remains moist. In addition to this, it happens that those who adopt this objectionable method pack the produce before it has properly cooled down, and naturally such copra is extremely liable to get mouldy. The copra thus prepared has a smoky smell and cannot possibly be used for making fat for consumption. This smoking of copra was first done in districts where much rain falls, and where the weather is unreliable. In these districts the drying in the sun is very risky, and moreover the method of preparation just described is much easier and quicker, and consequently brings quicker revenues, which is very important from the native point of view. Although a superior copra free of odour could be prepared everywhere, the population have not listened to good advice in many districts, and are still disinclined to improve their preparation methods. Even badly prepared copra is a valuable commercial product, and exporters will not refuse it. In consequence of the fact that a better method would not find immediate remuneration in the form of a higher price for the individual preparer, or even for whole districts, there is no stimulant for the voluntary adoption of such improved methods.

This is regrettable, as especially in the islands beyond Java some conditions are far more favourable than in Java, where the exporters try to get hold of as large as possible quantities, and are very lenient in appraising the value of the merchandise. When the copra market shows an upward tendency, the owners of the trees are very anxious to benefit by the higher market. The fruits are then picked in much larger quantities before they have sufficiently ripened, in consequence of which the average quality of the copra is much depreciated. If the

copra is made from nuts not fully ripe it contains a high percentage of water and remains flexible. The loss in weight on copra made from young nuts is much higher and the soft pieces are far more liable to be attacked by beetles and moulds.

These are all consequences of the fact that the cultivation of coconuts is in the hands of a population not sufficiently civilized to see the advantage of sacrificing a small immediate gain for the sake of larger future profits. The few European planters are very careful not to be influenced by fluctuations of the market price as far as harvesting is concerned. It is in their own interest to produce a regular superior quality so as to ensure a first class reputation for their produce. As long as the cultivation of coconuts in Netherlands East India remains in the hands of small planters, it will be very difficult to introduce a process of preparation giving more certainty for good produce. A few years ago, the Government tried their best to improve the preparation methods, erecting an experimental establishment for artificial drying in Central Java; the raw material was bought in the same way as the ordinary manufacturer of copra has to buy it. Without any administrative trouble, and on most economical lines, the copra was prepared and sold in Europe. Though the financial results were not bad, the experiment clearly showed that the prices obtained were not so much higher than the ordinary market prices, that artificial drying would be a paying industry. For this reason the experiment was abandoned. As a rule the quality of the Java copra manufactured during the dry season is quite good enough, but that of the rainy season is sometimes complained of. These complaints generally result in loss for the exporter, since the buyer naturally claims damages by way of arbitration if the quality of the copra turns out to be inferior to that which was contracted for. Special knowledge of the produce is required so as to be able to properly estimate the percentage of moisture, which the goods will lose before reaching their destination and the exporter may exercise as sharp a control as possible when the copra is received in his warehouse, yet the article is risky because the exporter has no means of covering himself against risks during the transport.

Malign fungus and insects may attack the most superior copra, and no means are known to avoid these.

A voyage of one month levels fairly well the quality of the copra which at the time of loading shows more or less important differences. The buyers therefore have to deal with a very limited number of different qualities only. These are F. M. S. (which means Fair Merchantable Sundried) and F. M. (Fair Merchantable), whereas the copra for which the exporter accepts no responsibility as far as quality is concerned is sold under the term of „tel quel” F. M. S. include all well-dried ripe copra which has not been in touch with smoke or at least does not show signs of having been in touch with smoke. F. M. includes sound copra which smells of smoke, besides mixtures of sun-dried and kiln-dried copra. Furthermore the market quotations depend on the geographical origin. Java copra is best quoted: sun-dried of other regions is always quoted slightly lower. There is no fixed difference between the various qualities, as they are used for different purposes, and more or less follow their own way. It is not necessary to say much in this respect, as the article is too well-known.

Copra, as it reaches the consumers, contains about 60% of oil and 40% residue. The residue is approximately composed as follows:

| | |
|----------------|------|
| Moisture | 10% |
| Oil | 10 „ |
| Proteins | 20 „ |
| Carbonhydrates | 39 „ |
| Fibre | 15 „ |
| Ash | 6 „ |

The fibre is very well digestible. In Europe the residue is a highly esteemed food for dairy cows as it has a stimulating action on the secretion of the milk and the fatcontents of same.

When the copra has a strong smell of smoke, it gives a cake which cannot be used as a cattle food but only as a manure, with approximately:

| | |
|-----------------|-------|
| Nitrogen | 3.5% |
| Phosphoric Acid | 1.0 „ |
| Potash | 2.5 „ |

The melting point of copra oil lies between 24° and 26° C. When liquid, the colour varies between light yellow and brown, when solid, between pure white and light brown.

During the latter part of the last century a start was made with the purification of copra oil for culinary consumption. So far it had only been used for the manufacture of soap. At present it is purified to such a degree that a white, tasteless, odourless, and very preservable fat is obtained. After preparation had reached this high grade of perfection the consumption of copra increased immensely. The purified oil—so-called coconut butter—is sold under different names, (palmin, vegetaline, etc.) and used in the kitchen. Enormous quantities are also utilised by manufacturers of artificial butter. For the soap manufacture, copra oil is of special importance, in the first place because it is one of the most asked for raw materials, and secondly because coconut soap gives an extraordinary lather, and can even be used in salt water. In Europe, and especially in France, coconut oil has a great reputation as a specific for promoting the growth of hair, and it is therefore used as a constituents for numberless pomades and other toilet requisites.

As was stated above, in Netherlands East India itself, the oil from the fresh nuts is used. It is liquid in a tropical climate, and answers to many requirements when in fresh condition. Copra oil is also used there in huge quantities and the manufacture of same in the colonies is steadily increasing. The island of Borneo gave a firstclass example, in precedence to Java. At Pontianak oil is pressed from copra since many years. This copra is grown on the Kapoeas Delta. Java possesses some up-to-date factories also since lately. The oil from the fresh copra is there, without any other than mechanical purification, of a superior quality, but all the same is always sold cheaper than the oil from fresh nuts. As regards the export of the residue (the cakes), the statistical review gives the necessary particulars. It must however be borne in mind that those figures not only include the residue from the copra oil-industry, but also the cake of other oil seeds, especially ground nuts.

Dessicated coconut is not being prepared in Netherlands East India; the time for it has not yet come. The like it would be prema-

ture to consider earnestly the possibility of replacing the export of copra by the export of oil. The present export of oil is more of an experimental character as far as it does not concern neighbouring countries.

The copra for Europe is generally shipped to optional ports, and for this reason, the official export statistics are not reliable as far as the destinations are concerned. Consequently figures are therefore omitted here. The exported quantities have amounted to in tons of 1000 Kg):

| | From Java. | From other islands. |
|------|------------|---------------------|
| 1908 | 96,728 | 132,763 |
| 1909 | 72,333 | 111,470 |
| 1910 | 107,992 | 140,156 |
| 1911 | 94,750 | 171,828 |
| 1912 | 92,105 | 155,350 |

The export depends on the weather of the moment, and of the period ten to twelve months before. When there is much rain, less copra is dried than during a dry season, and as regards the output as a whole this is always a big one when the time during which the fruits set, was one with a moderate rainfall. The fruits ripen all through the year.

Of the export ports in Java, Tjilatjap is the most important one. From this port, during 1912, 43,758 tons of copra were shipped. Then follows Sourabaya, with 20,597 tons, and Batavia with 15,397 tons. Of the possessions beyond Java, the following exports were recorded in 1912:

Macassar, 37,812 tons, Pontianak, 14,410 tons, Bali 14,682 tons, Padang 12,876 tons, Gorontalo 8,158 tons, Menado 7,286 tons, etc., etc.

* * *

Ground Nuts. The peanut is not a stranger to the American reader, and for this reason one needs not dwell longer on this subject than necessary to expose its economical importance for Netherlands East India. Originating from tropical South America it was introduced into Netherlands East India some centuries ago, presumably via Japan. Already in the middle of the 18th century, the nut was grown at Batavia on a rather large scale, but since

that time it has not been spread much outside of Java. Only the island of Bali, the interesting country East of Java, exports considerable quantities. Furthermore the island of Sumatra cultivates this produce, but the quantities are hardly worth mentioning.

The cultivation takes place on non-irrigatable lands, and also as a secondary crop between two consecutive rice crops on irrigatable lands: it is exclusively in native hands. Sugar cane fields are especially planted up with ground nuts immediately after the cane has been harvested. It is grown either for the fruits or for the straw. More and more however the aim of the native farmer is to get the nuts as well as the straw. Properly speaking this combination is not desirable since it leads to harvest the nuts as soon as they are full grown but not yet dead ripe. If dead ripe the foliage withers and is unfit for cattle-food. When harvested too early, the oil contents is poor which is very material, as in this country, unlike the United States, the nuts are exclusively used for preparing oil.

Some ten years ago the ground nut trade was considered to be only good enough for the Chinaman; and the preparation of groundnut oil was also practically left to the natives and Chinese. The seeds which only contained 42 to 46% of oil compared unfavourably with the African nuts manufactured in Europe which contain 48 to 51 %. For the sale of the nuts when not locally used, one had to rely on the nearest, eastern markets.

The export of oil was rather considerable. In 1904, 23,930 H. L. of groundnut oil was exported from Java, whereas during that year the export of nuts was so unimportant that the official statistics made no mention of it. Since then however the export of oil suddenly rapidly decreased, whereas the export of nuts remarkably gained showing themselves fit for the European market. It is very difficult to see how it has been possible to increase the quality of the produce to such a degree without introducing new varieties, but all the same it is a fact that Java, apart from some poor qualities, produces at present ground nuts with an oilcontents no smaller than the best of West-African origin. It may be possible that the increased value of the ground nuts led to the extension of this cultivation on more fertile lands.

In former days, the native farmer was not anxious to sacrifice the fertility of his wet rice fields to a hardly remunerative secondary crop.

Different varieties are cultivated. One group form varieties which ripen in 3 to 4 months, and another group form the kind which from times unmemorial has been grown in Java, and which ripens in 6 to 7 months. But the latter kind is gradually replaced by the early riping varieties.

The nuts are exported either in the shell or decorticated. The decorticating is done by hand. 100 K. G. nuts in the shell give about 75 to 79 K. G. kernels.

The export amounted to (in tons of 1000 Kg.):

(a) Nuts in the Shell.

| in/from | Soura- baya. | Cheri- bon. | Sama- rang. | Batavia. | Other Java ports. | Bali. | Else- where. |
|---------|-----------------|----------------|----------------|----------|-------------------------|-------|-----------------|
| 1908 | 4,064 | 1,379 | 4,338 | 1,017 | 284 | 2,035 | 18 |
| 1909 | 3,650 | 994 | 1,564 | 1,991 | 15 | 905 | 4 |
| 1910 | 4,498 | 2,215 | 2,224 | 2,492 | 77 | 970 | 133 |
| 1911 | 7,661 | 2,568 | 3,624 | 1,907 | 329 | 1,582 | 190 |
| 1912 | 5,097 | 1,786 | 1,383 | 1,530 | 206 | 2,579 | 464 |

(b) Decorticated Nuts.

| in/from | Cheribon | Sourabaya | Other Java ports | Elsewhere |
|---------|----------|-----------|---------------------|-----------|
| 1908 | 6,656 | 3,151 | 483 | 21 |
| 1909 | 5,714 | 2,278 | 131 | 30 |
| 1910 | 8,614 | — | 211 | 120 |
| 1911 | 8,369 | 688 | 115 | 225 |
| 1912 | 8,904 | 79 | 36 | 121 |

Singapore and Marseilles are the largest buyers. The U. S. A. in 1912, according to the official statistics, received 549 tons decorticated nuts from Java.

* * *

Kapok Seeds occupy, as far as the value is concerned, the third place among the Neth. East Indian oil seeds. They form the valuable byproduct of the tree, *Eriodendron anfractuosum D. C.*, which supplies the Java kapok, the excellent vegetable down for stuffing beds, life saving materials etc., which in America is far too seldom used. The whole supply of genuine Kapok is practically derived from Netherlands East India, and since this is a very big quantity, the seed crop is also very large, seeing against one part of fibre two parts of seed are produced. Twenty years ago the seed was still considered valueless and burned. At present it is sold on the spot for fl. 5.00 and more per 100 Kg. The seeds are round and have the size of small peas; the black skin, which is absolutely free of fibre, is brittle and amounts to 40 to 44% of the weight of the seed. Undecorticated, they contain 23% of a non-drying, yellow oil, free of rancid taste or smell, with a great similarity to refined cotton oil.

The export of these seeds in tons of 1000 Kg. amounted to:

| In/from | Sama-rang. | Soura-baya. | Djoea-na. | Batavia. | Other Java ports. | Else-where. |
|---------|------------|-------------|-----------|----------|-------------------|-------------|
| 1908 | 6,770 | 4,684 | — | 1,020 | 1,130 | 4 |
| 1909 | 6,133 | 4,345 | — | 929 | 1,118 | 62 |
| 1910 | 3,367 | 3,912 | 1,260 | 565 | 975 | 78 |
| 1911 | 5,151 | 5,868 | 2,638 | 931 | 852 | 98 |
| 1912 | 6,013 | 5,907 | 2,607 | 1,318 | 1,900 | 53 |

The principal buyers are the United Kingdom and Marseilles. The U. S. A. are not mentioned in the official export statistics.

Part of the Kapok seed crop is used in Java. When extracted the proceeds amount to 22%, when hydraulically pressed, 18% of oil. The oil is used by the native population for baking, either pure or mixed with other oils. The extracted oil however is less in demand, due to a slight smell of benzine which is hardly avoidable. For manufacturing hard soaps, the only kind in demand in this country, kapok oil must be mixed with other oil. The residue is used for manuring purposes · the percentage of nitrogen varies between 4 and 4½ %. In Europe it is used as a cattle food, in which case 7% fat is left in the cakes, then containing about 28% proteins. Most probably in Europe the seeds are first decorticated, which is not the practice here. In Java the oil cake is rejected by cattle.

In connection herewith the attention may be drawn to a small quantity of **cotton seed** exported from this country. Java exported 685 tons in 1912, of which 2/3 went to England. The cultivation of cotton in Netherlands East India is not important, and the majority of the raw product which has a very short staple is exported unginned. A few years ago however two ginneries were established, one of which is connected with an oil mill. The manufacture of cottonseed-oil however was hardly remunerative and has since been stopped.

* * *

Castor-oil Seeds are produced in small quantities. The export according to the official statistics amounted to (in tons of 1000 Kg.)

| In/from | Samarang. | Sourabaya. | Proboling- go. | Other ports. |
|---------|-----------|------------|-------------------|--------------|
| 1908 | 2,445 | 2,221 | 538 | 81 |
| 1909 | 1,174 | 1,107 | 606 | — |
| 1910 | 329 | 414 | 97 | — |
| 1911 | 142 | 481 | 55 | 11 |
| 1912 | 764 | 415 | 305 | — |

During 1912 half of the crop went to Italy, and the remainder was divided amongst other European countries of destination.

The cultivation is fairly risky, as the crops very often fail owing to untimely rains in the dry season. For this reason, and also because in Java too castor oil for lubricating purposes is gradually replaced by mineral oils, the cultivation is being reduced. A great many varieties are cultivated, but only a few are exported, which however are of extraordinary superior quality. In Netherlands East India a fair quantity of seed is pressed for medical and technical use for home consumption.

* * *

Of still smaller importance is **Sesam seed**. Its export in tons of 1000 Kg. amounted to :

| In/from | Soura- baya. | Pana- roekan. | Other Java ports. | Palem- bang. | Macas- sar. | Else where. |
|---------|-----------------|------------------|-------------------------|-----------------|----------------|----------------|
| 1908 | 1,918 | 231 | 106 | 388 | 383 | 3 |
| 1909 | 492 | 492 | 44 | 210 | 475 | 4 |
| 1910 | 234 | ? | 5 | 375 | 292 | 18 |
| 1911 | 434 | — | — | 192 | 194 | 15 |
| 1912 | 579 | 94 | 22 | 303 | 292 | 11 |

Several varieties are grown. Inferior qualities with thick skins and consequently low percentage of oil are not exported, and white and red-brown species of the good variety *Sesamum indicum* L, which contain a high percentage of oil, are mostly sent to Singapore.

* * *

More interesting are the oil seeds collected in the forests of which **Tengkawang** is the principal and best known. This fat which is known in the European market as „Borneo Tallow” is obtained from a certain number of trees of the *Dipterocarpaceae* family, which representatives are very frequent in Borneo

and Sumatra. However, only a few species of this large family may be considered as the true Tengkawang trees. The most prominent bears the scientific name of *Shorea stenoptera*, Burck. Besides, the Tengkawang of the trade is obtained from *Shorea aptera*, Burck, *S. Gysbertsiana*, Burck, *S. scaberrima* Burck, and probably also from *Isoptera borneensis*, Scheff. (The fruits of the latter however are very small). Furthermore there are a number of species the fruits of which supply Tengkawang for local use. The botanical origin of these is still unknown, or at least very uncertain. The fruits of all Tengkawang species differ in size, varying between that of a fowl egg and a marble. They consist of a hard woody shell, provided with wings of different sizes. The kernel consists of two oil-containing seed lobes. Some species are cultivated by the population. In Borneo this is only the case with *Shorea stenoptera* which produces the largest fruits with comparatively small wings which are not much larger than the fruit itself, and not more than 1½ c.M. wide.

Of the cultivation of trees by un-civilized people like those in Borneo, no illusion should be created. The plot of land selected for rice cultivation is felled and burned for two, or at the most, three crops and thereafter abandoned, in order to open new land elsewhere. Simultaneous with or shortly after the last crop, the very scarce population very often plant fruit trees, rattan, gum benjamin and similar useful plants. After they have been planted, they are left uncared for until, usually many years later, the fruits can be collected. In this manner the *Shorea stenoptera* is „cultivated” in the Western part of Borneo. In Sumatra, where this is not found, other species are cultivated.

The Tengkawang trees which very often form forests, flower towards the end of the dry season, and the fruits ripen five to six months later. By the time that they are so ripe that they spontaneously fall down, men and women as well as children invade the forest and live there temporarily. The dropping of the fruits is then watched. If the weather is favourable — that means if the weather is very bad — the crop is soon over; but sometimes it takes six to eight weeks before everything is collected. Thereafter the nuts are decorticated,

and the method of decorticating largely influences the quality of the product. In former days, the preparation was generally done by means of a wet process which resulted in an excellent produce. The wings were first removed by threshing (with some kinds the collectors even bit off the wings) after which the fruits were put in big baskets which were immersed in a river for 30 to 40 days. The shell thereby became very weak and finally burst, which facilitated the removal of the shell considerably. The seeds could be kept for about one year without being attacked by vermine, and the fat was of an excellent quality. However the doctrine that time is money the Dayak interpreted in his way, and not making himself uneasy about the quality, he little by little, finally did away with the wet process. For his own consumption, the seeds were always decorticated without soaking. They were simply dried and pressed. For the trade, the decorticating is now done by allowing the fruits to germinate. They are simply deposited in a moist place; when germinated the shells are removed and the sprouts broken off, after which the kernels can be dried. However the germination process has a bad influence on the quantity of the fat as well as on the quality. There are still other methods of avoiding the long wet process. The fruits are boiled or poured over with boiling water, and in order to give the kernels an ordinary appearance, they are buried for a few days and thus obtain very soon a dark brown colour. But during this fermentation process they lose a good deal of their value. The kernels can be dried either in the sun, or — more quickly — above a fire. Consequently there is no reason for the Dayak not to smoke his product until it is dry.

Whereas formerly Tengkawang fat was looked upon as a superior product of higher value than tallow, the present quality is as a rule inferior. This however does not mean that good Tengkawang fat cannot be obtained any more. Fresh, well-prepared Tengkawang fat is of a soft neutral taste. It is one of the few fats which do not turn rancid, even in the tropics, and which can be kept for years. In the Tengkawang districts it is more than anything the fat used for consumption by the natives. If the Tengkawang fat has for some purposes

not responded to high expectations, for instance, as a substitute for cocoa butter, the reason must not be found with the fat itself but simply with the preparation.

For technical purposes, Tengkawang fat is used as an excellent raw material for the manufacture of candles and hard soaps. It consists of from 70 to 80% solid fatty acids. Its melting point lies between 34 to 35 degrees C.

The fat usually sent to the European markets via Singapore since many years, was originally prepared by the population by means of most primitive methods. Later on two oil mills in Pontianak, which naturally obtained higher proceeds, laid their hands on the export. But whereas in 1909 a fairly large amount of Tengkawang nuts was harvested, the export of the fat did not exceed 45 tons. Since then the export of this fat has practically ceased as the factories met with too many difficulties in obtaining good raw material for the preparation of superior fat.

The export of Tengkawang kernels during the years 1908/11 from Pontianak were respectively 288, 1482, 340 and 713 tons. Sambas also exported a trifling. In 1912, in consequence of an exceptional crop, exports were also made from other districts, but there are at present, no figures available as regards these. The crops vary a good deal. They fail so often all over the Tengkawang districts that it is sometimes said that the Tengkawang trees only flower every five or six years. This is not correct; the flowering is not irregular, but a large crop only results when the dry season is a long one, and gradually changes into the wet season. A little rain is always desirable, but heavy showers are detrimental, because as a rule in the Tengkawang districts the showers, especially during the dry season and during the change into the wet season, are combined with strong winds. These take away the flowers and young fruits. Thus when the weather is normal the crop will fail. Although not all species are dependent from the caprices of the climate in the same degree, the crops proved to be equally uncertain in Java where the best species of Borneo have been cultivated experimentally.

* * *

Finally an article which is placed in the market from Singa-

pore by the name of „**Vegetable Tallow Siak**” must be mentioned here. This produce originates from the district of Siak and the adjacent districts on the East Coast of Sumatra, and is obtained from two trees, viz: *Palaquium oleosum*, Burck, and *P. pisang*, Burck. These are found growing wild there in great numbers in the low lying country, but are not missing elsewhere in Sumatra and Borneo. They belong to the *Sapotaceae* family which include all trees supplying gutta percha. Almost all species of this family produce seeds containing useful fat. The gutta percha of the two species just mentioned is practically valueless. The fruits are edible, and are very often the only nourishment for the collectors, when their food supply is exhausted. When the seeds are being collected, the flesh and the skins are removed by hand and thereafter the kernels are dried in the sun. The production per tree is unknown. The percentage of fat differs with both species with a few percent, and amounts to approximately 50%. The fat of the two species is not quite the same although it is sold under one name. That from *Palaquium oleosum* is white and palatable and is used by the native population for consumption. The [fat] of *Palaquium pisang* is slightly softer, and of a yellowish colour with a bitter taste. It is used in Singapore for greasing the pans in which tapioca flake and pearl are prepared. The seeds are exported to Singapore or sold to some small Chinese manufacturers in Bengkalis, who turn them into fat which is later on sent to Singapore.

The export is small, and varies exceedingly. The total quantity exported during 1908-12 from the various small ports on the East Coast of Sumatra amounted to respectively: 465, 902, 972, 105 and 52 tons of seeds, whereas Bengkalis exported approximately 15,520, 25,823, 96,194, nil and nil Kg. of fat.

Other wild plants producing useful fats are very numerous in Netherlands East India, but in view of the fact that regular big shipments of seeds can only be very seldom guaranteed, it is extremely difficult to arouse interest for them.

K. HEYNE.

Value (in units of one thousand guilders) of the Export from Netherlands East India of Oilseeds, Oils and Fats.

| | Copra. | Coconut-oil. | Oilcake. | Ground-nuts. | Kapok-seed. | Cotton-seed. | Castor-oil. | Sesam. | Teng-kawang. | Vegetable tallow | Total. | |
|---------------------|--------|--------------|----------|--------------|-------------|--------------|-------------|--------|--------------|------------------|--------|--------|
| 1908. Java | 14,509 | 3 | 1 | 1,668 | 408 | — | 370 | 226 | — | — | 17,185 | 37,980 |
| “ Other possessions | 19,914 | 384 | 51 | 208 | — | — | — | 116 | 50 | 72 | 20,795 | |
| 1909. Java | 10,850 | 1 | — | 1,631 | 376 | — | 204 | 103 | — | — | 13,165 | 30,628 |
| “ Other possessions | 16,702 | 332 | 62 | 94 | 2 | — | — | 69 | 150 | 52 | 17,463 | |
| 1910. Java | 18,359 | 11 | — | 2,996 | 504 | 1 | 101 | 46 | — | — | 22,018 | 47,063 |
| “ Other possessions | 23,827 | 689 | 177 | 164 | 4 | — | — | 96 | 39 | 49 | 25,045 | |
| 1911. Java | 18,950 | 23 | 81 | 3,559 | 772 | 2 | 90 | 61 | — | — | 23,538 | 59,235 |
| “ Other possessions | 34,366 | 709 | 215 | 266 | 5 | — | — | 56 | 75 | 5 | 35,697 | |
| 1912. Java | 18,421 | 40 | 191 | 1,743 | 887 | 21 | 193 | 97 | — | — | 21,573 | 55,004 |
| “ Other possessions | 31,070 | 626 | 194 | 415 | 3 | 21 | — | 85 | 1,017 | — | 33,431 | |





